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STS Consultants, Ltd.
Solutions through Science & Engineering

July 18, 2001

Mr. Fred Micke, On-Scene Coordinator
U. S. Environmental Protection Agency
Region 5
77 W. Jackson Blvd., SE-5J
Chicago, Illinois 60604

RE: Environmental Gamma Radiation Survey, 341 East Ohio Street, Chicago, Illinois - STS Project No. 1-25585-XG

Dear Mr. Micke:

STS Consultants, Ltd. (STS) has prepared this scope of work for environmental services at the 341 East Ohio Street site in Chicago, Illinois. The proposed work described herein is for a drilling and downhole logging program to explore for potential radiologically impacted soil at the perimeter of the subject site. The proposed scope of work is based on the information gathered during previous studies of the site, discussions with USEPA, and our experience on similar projects in the Chicago area.

BACKGROUND

Previous investigations have identified areas indicative of material containing radionuclides above the cleanup level established for the area by the U.S. Environmental Protection Agency (USEPA). Excavation and disposal of radiologically impacted soil at the site is currently planned for later this year. This excavation will include radiation survey assessment of the fill material within the property boundary to depths of between 8 and 15 feet. Excavation to the required depths would necessitate installation of a soil retention system (sheet piling) along the property boundary.

To minimize the potential cost of soil retention, STS has reviewed alternatives to its use. One potential alternative would be maintaining a 1 V:1.5 H slope along the property boundary. However, to avoid the excavation of the slope material while still providing an assessment of potential radioactive material, USEPA would require a survey verifying that the material within that slope is not impacted by radiological materials.

PROPOSED SCOPE OF WORK

This scope of work describes a drilling program to explore the soil around the perimeter of the site. The objective of the drilling is to adequately demonstrate the absence of impacted soil, or to identify the locations where impacted soil is present. This demonstration could then be used to avoid construction of a soil retention system, which would be required if the soil were to be excavated.

This drilling option for exploring the perimeter of the site would consist of drilling boreholes on a 2-meter square grid along the north, east and south margins. For areas with a proposed excavation depth of 8 feet (12-foot width), 2 rows of boreholes 1.4 meters apart would be required. A borehole spacing along each row of 2.8 meters would be utilized to obtain the required 2 meter boring density (see attached drawing) along with the post-excavation survey of the bottom edge of the slope. The 15-foot excavation would require 5 rows of boring with a similar borehole and survey spacing. The boreholes would extend to a depth beyond the proposed excavation depth (i.e., minimum 1 foot into native soils). The boring would be down-hole logged for gamma readings in 6-inch increments.

The exterior (closest to the property boundary) line of borings would be conducted first. Any sections exhibiting evidence of impact on the exterior line would not have to be drilled/logged on the interior line or lines because the presence of impacted material would necessitate the excavation of material and utilization of soil retention along the property boundary. Based upon the results on the exterior line, the interior drilling would be conducted. Gamma logging of the interior borings would only be performed on the lower portions of the borehole that are proposed to be unexcavated in the 1 V:1.5 H wedge of soil around the site perimeter. Finally, to minimize drilling costs, the innermost section of the slope (toe of slope, portion less than 18 inches thick) would not be drilled but would be surveyed following the excavation of that portion of the site.

STS would propose to conduct this downhole survey of the property boundary prior to the general site excavation utilizing a 2-meter square grid network (see attached sketch). Assuming that a hot spot would have the shape of an elongate ellipse (twice has long as it is wide), the 2-meter square grid would have the ability to detect a hot spot of 6.3 m^2 (68 ft^2) with better than a 99% probability. This probability estimate was calculated utilizing USEPA's ELIPGRID-PC (version 10/20/95) and assumes that the gamma probe has an effective zone of detection at least one foot radius from the center of the boring. The statistical program output is attached for your review. Contact Dr. Steven Kornder (847-279-2448) with questions regarding the statistical analysis.

To complete the above survey an estimated 380 borings would be required. The total footage consisting of both 10 and 16 foot borings would be approximately 5320 feet. Soil borings would be completed at the corner of each 2-meter square utilizing a solid stem auger. In the event an obstruction is encountered which prevents completion of a boring, an offset within a 0.3 meter (1 foot) radius will be drilled. If the obstruction continues to prevent the completion of the boring after 2 offset attempts, an alternate drilling method utilizing a rotary bit capable of rock drilling will be employed. This method is expected to be able to penetrate any large stone, concrete, or masonry obstruction encountered.

Following completion of the boring, a section of 3-inch PVC pipe would be temporary inserted into the borehole to allow for the completion of the down-hole gamma logging.

The PVC pipe would prevent the borehole from collapsing and protect the logging equipment from being damaged during the survey.

Cuttings from the boreholes would be segregated for disposal based upon a gamma radiation survey. Cuttings would be surveyed at the ground surface using a Ludlum 2221 detector and a 2 x 2 NaI probe. Impacted soils would be containerized (placed in drums or Supersacks) for disposal. Soils exhibiting background levels of gamma radiation would be stockpiled onsite for later utilization and/or disposal. This stockpiled material will be covered to prevent wind or precipitation erosion. Costs for disposal and/or further characterization of either the impacted soil or clean soil have not been included within this proposal.

STS proposes a four task scope of work for the program. The tasks are:

1. Finalize a work plan and health and safety plan (HASP) for review by USEPA. This work scope and the generic HASP for vicinity sites are being submitted for Agency review. If USEPA agrees with the plan, drilling of the shallow boreholes could commence while a CERCLA waiver is pursued for the deeper borings.

2. Installation of approximately 380 borings along the perimeter of the property on the north, east and south margins. (The presence of the deep foundation and basement for the Time-Life building precludes the need for a soil retention system along the west margin of the site.)

3. Down-hole gamma logging to determine the potential presence and vertical extent of the radiologically impacted soil at each borehole.

4. Project management and preparation of a summary report of the investigation findings.

A detailed description of these tasks is presented below.

Task 1—Work Plan and Health and Safety Plan Revisions

It is anticipated that this work scope description would serve to provide the information necessary for USEPA to complete a review. This task also includes submittal of a generic HASP that has been prepared for similar projects. Alternatively, the HASP submitted and reviewed by USEPA for the Remediation Work Plan can be applied to this work.

Task 2—Soil Borings

Time is a potential issue with the installation of the borings. Upon approval by USEPA, the installation of the shallow borings would commence. Depending upon the soil conditions encountered, installation of the boring is anticipated to require 35 to 45 rig-days of drilling to complete. While additional drill rigs could be utilized to shorten the time, the deeper

holes (>12 feet) require approval by the Board of Underground (BOU). This approval might typically take 45-60 days. However, a quicker turnaround may be possible given the CERLCA allowance for permit waiver for "substantial compliance with permit provisions". BOU approval is for the purpose of protection of utilities. In that the excavation plan has been submitted and is nearing completion of the BOU approval process, the requirement for "substantial compliance with permit provision" has, in our opinion, been met. A meeting with Chicago Department of Transportation representatives would be proposed, but we would request USEPA efforts in support of seeking a waiver of the full BOU review cycle.

The exterior line of borings closest to the property boundary would be conducted first. This drilling is anticipated to include about 115 boreholes (1,420 linear feet) and would require 10 to 12 rig-days to complete. Following the completion of each boring a 3 inch ID PVC casing will be placed in the boring to keep the borehole from collapsing and protect the logging equipment from potential damage during logging. After completion of the down-hole logging the PVC casings would be removed for potential reuse in future boreholes. Following removal of the PVC, the boreholes would be backfilled with high solids bentonite chips or similar material. If an exterior borehole section exhibits evidence of radiological impacts, subsequent interior boreholes would not be drilled since the presence of impacted materials would necessitate excavation and utilization of soil retention along that stretch of the property boundary.

Task 3—Gamma Survey

The boreholes will be gamma logged in 6-inch increments. The down-hole logging will be conducted using a Ludlum 2221 detector and a 2 x 2 NaI probe. Gamma logging of the interior borings would only be performed on the lower portions of the borehole that are proposed to remain onsite post-excavation. Following the completion of the excavation, the innermost section of the slope (last two feet with a thickness of less than 18 inches) would be surveyed as part of surveying the surface of the sloping wedge of material remaining in place (see figure).

Task 4— Project Management and Summary Report

A summary report will be prepared for the data generated in this investigation. The report will include tabulated results and a map with boring locations and gamma survey results from the down-hole logging. The report will be provided for your review and comment before being finalized.

It is also anticipated that a meeting may be held to discuss and present the data generated as part of this investigation. The meeting would include the property owner (or representatives) and the USEPA. For the purpose of this proposal, STS has anticipated one meeting.

SCHEDULE

This work would entail a schedule of 5 to 6 weeks. We would seek to advise the Chicago Department of Transportation of our program and seek to obtain a waiver under CERCLA. That effort would take on the order of 1 to 2 weeks. Drilling could be completed in 2 to 3 weeks depending on the number of rigs mobilized. The downhole logging would proceed concurrent with the drilling and be completed within several days of the completion of the drilling program. The final report of findings would be completed within perhaps 2 weeks of completion of the drilling and logging efforts.

Should you have any questions with regard to the scope of services, fee estimate or work schedule as indicated herein, please contact us.

Respectfully,

STS CONSULTANTS, LTD.

Steven Kornder, Ph.D.
Senior Geochemist

Richard G. Berggreen, C.P.G.
Principal Geologist

cc: Timothy Ramsey, Piper Marbury Rudnick & Wolfe

Attachments: Figure 1
Statistical Analysis

ATTACHMENT

STATISTICAL ANALYSIS

File: Readme
Date: 10/20/95
By: Jim Davidson, ORNL/GJ, (970) 248-6259

The ELIPGRID-PC program provides an easy-to-use interface to the ELIPGRID algorithm. It should run on just about any PC with 512 KB RAM. Also, disk space requirments are very small in this day of multiple MB Windows programs.

Note that two input file formats are supported. (1) The original ELIPGRID FORTRAN-style format. See Test100.In for an example. (2) A Simplified Input Format (SIF) that removes the need to worry with exact column positions. See Test100.SIF sample input file for more information. OF COURSE, THE SCREEN INPUT OPTION REMOVES THE NEED FOR A DATA INPUT FILE ALTOGETHER.

TO USE THE PROGRAM UNDER DOS:

(1) Make a new subdirectory on your harddrive, for example:
C:\>MD ELIPGRID

(2) Change to new subdirectory:
C:\>CD ELIPGRID

(3) Copy all files from the floppy disk in drive A: or B:
C:\ELIPGRID>COPY A:*.* or COPY B:*.*

(4) To use ELIPGRID-PC:
C:\ELIPGRID>EGPC

(5) For a help screen listing start-up options:
C:\ELIPGRID>EGPC ?

TO USE THE PROGRAM UNDER WINDOWS:

(1) Copy program to your harddrive as described above.

(2) Use the Windows File menu, Run option to start ELIPGRID-PC.

OR

Use the Windows File menu, New option to create an icon to start

ELIPGRID-PC.

(3) Use the Alt-Enter key sequence to switch the program from a DOS character
mode screen to a Window DOS box in graphics mode and back.

GENERAL NOTE:

See chapter 10, Locating Hot Spots, in "Statistical Methods for Environmental Pollution Monitoring" (Gilbert 1987). This chapter is an explanation of how to use the ELIPGRID algorithm by graphical means.
ELIPGRID-PC can be used to extend or replace the graphs.

The F1 key provides some further help in the program.

SOME REFERENCES:

Gilbert, R.A. 1987. Statistical Methods for Environmental Pollution Monitoring. Van Nostrand Reinhold, New York.

U.S. EPA. 1989. Methods for Evaluating the Attainment of Cleanup Standards
Volume 1: Soils and Solid Media, EPA, Washington, DC.

Output from ORNL ELIPGRID-PC Program Version: 10/20/95
File name.: A:\GRIDSA~1\SCREEN2.OUT
Created on: 07/09/01
Input file: From screen

Grid Type	Semi-major Axis in Rel. Units (L/G)	Gridspace in Meters	Shape	Angle deg	Prob. Hitting 1.0-P(0)
Square	1.00	2.00	0.50	0.0ø	0.9566
Square	1.00	2.00	0.50	10.0ø	0.9920
Square	1.00	2.00	0.50	30.0ø	1.0000
Square	1.00	2.00	0.50	45.0ø	1.0000•

Output from ORNL ELIPGRID-PC Program Version: 10/20/95
File name.: A:\GRIDSA~1\SITE001.OUT
Created on: 07/18/01
Input file: From screen

Grid Type	Semi-major Axis in Rel. Units (L/G)	Gridspace in Meters	Shape	Angle deg	Prob. Hitting 1.0-P(0)
Square	1.00	2.00	0.50	Random	0.9925
Square	1.00	2.00	0.50	0.0ø	0.9566
Square	1.44	1.39	0.50	0.0ø	1.0000•